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Development of a kidney-on-a-chip model for compound screening and transport studies

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Citation

Vormann, M. K. (2021, September 9). *Development of a kidney-on-a-chip model for compound screening and transport studies*. Retrieved from <https://hdl.handle.net/1887/3209238>

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Issue Date: 2021-09-09

Curriculum Vitae

Marianne Katharina Vormann was born on December 8th 1986 in Gräfelfing, a municipality in the district of Munich, in Bavaria, Germany. After graduating from the pre-university education at Marienschule in Münster (Westfalen) she started with her bachelor studies General Engineering Science at Hamburg University of Technology (TUHH) in 2006. During her bachelor studies she followed the specialization biomedical engineering. She wrote her Bachelor thesis about how to optimize the calculation of radiation doses during radiotherapy of head and neck cancers. Her bachelor studies were followed by a master study in biomedical engineering, also at TUHH. The first year of her master studies she participated in the European exchange program Erasmus and conducted her studies at Chalmers University of Technology in Gothenburg. During her studies in Gothenburg she got fascinated in the field of tissue engineering, in which field she received the opportunity to visit courses and perform small practical projects. Back in Hamburg she continued to work in the field of tissue engineering by conducting her project thesis focusing on cytotoxicity testing on cell cultures at the Institute of Bioprocess and Biosystems Engineering. Realizing that tissue engineering might be an important way to replace animal testing in long term she conducted an 8 months internship under the supervision of Matthias Brandenburg at Fraunhofer Research Institution for Marine Biotechnology EMB in Lübeck. During this internship she worked on a method to prepare stem cells which were isolated from human sweat glands for clinical translation meeting the GMP guidelines.

After obtaining her master's degree in 2013 she started working as a scientist at Mimetas in 2014. In parallel to her work at Mimetas she started in 2015 a PhD at the division of Analytical BioSciences at the LACDR, Leiden University under the supervision of Thomas Hankemeier in collaboration with Mimetas where she was supervised by Henriette Lanz. The project was focused on developing a 3D Kidney-on-a-chip model which can be used for toxicity screenings, transport studies, and disease modeling.

Currently Marianne is still employed at Mimetas as a Scientist. However, she is at this moment on parental leave discovering Europe with a camper together with her family.

List of publications

In this thesis - published

MK Vormann, L Gijzen, S Hutter, L Boot, A Nicolas, A van den Heuvel, J Vriend, CP Ng, TTG Nieskens, V van Duinen, B de Wagenaar, R Masereeuw, L Suter-Dick, SJ Trietsch, MJ Wilmer, J Joore, P Vulto, and HL Lanz. 2018. *"Nephrotoxicity and Kidney Transport Assessment on 3D Perfused Proximal Tubules."* AAPS J. Doi: 10.1208/s12248-018-0248-z

MK Vormann*, J Vriend*, HL Lanz, L Gijzen, A van den Heuvel, S Hutter, J Joore, SJ Trietsch, C Stuut, TTG Nieskens, JGP Peters, D Ramp, M Caj, FGM Russel, B Jacobsen, A Roth, S Lu, JW Polli, AA Naidoo, P Vulto, R Masereeuw, MJ Wilmer, L Suter-Dick. 2021. *"Implementation of a Human Renal Proximal Tubule on a Chip for Nephrotoxicity and Drug Interaction Studies."* J Pharm Sci. Doi: 10.1016/j.xphs.2021.01.028. *Authors contributed equally.

In this thesis - Submitted

MK Vormann, LM Tool, M Ohbuchi, L Gijzen, R van Vught, T Hankemeier, F Kiyonaga, T Kawabe, T Goto, A Fujimori, P Vulto, HL Lanz & K Tetsuka. 2021. *"Modelling and prevention of acute kidney injury through ischemia and reperfusion in a combined human renal proximal tubule/blood vessel-on-a-chip."* Kidney360 - In submission.

Other publications

SJ Trietsch, E Naumovska, D Kurek, MC Setyawati, **MK Vormann**, KJ Wilschut, HL Lanz, A Nicolas, CP Ng, J Joore, S Kustermann, A Roth, T Hankemeier, A Moisan, and P Vulto. 2017. *"Membrane-Free Culture and Real-Time Barrier Integrity Assessment of Perfused Intestinal Epithelium Tubes."* Nat Commun. Doi: 10.1038/s41467-017-00259-3

L Suter-Dick, L Mauch, D Ramp, M Caj, **MK Vormann**, S Hutter, HL Lanz, J Vriend, R Masereeuw, and MJ Wilmer. 2018. *"Combining Extracellular MiRNA Determination with Microfluidic 3D Cell Cultures for the Assessment of Nephrotoxicity: A Proof of Concept Study."* AAPS J. Doi: 10.1208/s12248-018-0245-2

J Vriend, TTG Nieskens, **MK Vormann**, BT van den Berge, A van den Heuvel, FGM Russel, L Suter-Dick, HL Lanz, P Vulto, R Masereeuw, and MJ Wilmer. 2018. *"Screening of Drug-Transporter Interactions in a 3D Microfluidic Renal Proximal Tubule on a Chip."* The AAPS Journal. Doi: 10.1208/s12248-018-0247-0

F Schutgens, MB Rookmaaker, T Margaritis, A Rios, C Ammerlaan, J Jansen, L Gijzen, **MK Vormann**, A Vonk, M Viveen, FY Yengej, S Derakhshan, KM de Winter-de Groot, B Artegiani, R van Bortel, E Cuppen, APA Hendrickx, MM van den Heuvel-Eibrink, E Heitzer, HL Lanz, J Beekman, JL Murk, R Masereeuw, F Holstege, J Drost, MC Verhaar and H Clevers. 2019. *"Tubuloids derived from human adult kidney and urine for personalized disease modeling."* Nat Biotechnol. Doi: 10.1038/s41587-019-0048-8

J Vriend*, **MK Vormann***, HL. Lanz, J Joore, SJ Trietsch, FGM Russel, B Jacobsen, AB Roth, S Lu, JW Polli, AA Naidoo; R Masereeuw, MJ Wilmer, L Suter-Dick. 2021. "Nephroscreen: a robust and versatile renal tubule-on-a-chip platform for nephrotoxicity assessment." *Current Opinion in Toxicology*. Doi: 10.1016/j.cotox.2021.03.001. *Authors contributed equally.

L Gijzen, FAY Yengej, F Schutgens, **MK Vormann**, CME Ammerlaan, A Nicolas, D Kurek, P Vulto, MB Rookmaaker, HL Lanz, MC Verhaar & H Clevers. 2021. "*Culture and analysis of kidney tubuloids and perfused tubuloid cells-on-a-chip.*" *Nat Protoc*. Doi: 10.1038/s41596-020-00479-w

Patents

P Vulto, SJ Trietsch, HL Lanz, **MK Vormann**. Barrier Function Measurements. 2017

Acknowledgements

Henriette, wat was het bijzonder onder jouw begeleiding een PhD te mogen doen. In het begin wisten we nog niet waar ons project naartoe ging, maar het was fantastisch om te zien hoe ver we uiteindelijk met het nierproject zijn gekomen. Ik heb heel veel van je geleerd de afgelopen jaren.

Paul en Jos, jullie hebben me de mogelijkheid gegeven bij Mimetas naast mijn baan een PhD te doen. Dit vertrouwen waardeer ik van harte.

Thomas, die Möglichkeit, als externer Student ein Promotionsprojekt unter deiner Begleitung machen zu dürfen, war für mich eine große Ehre. In unseren Gesprächen habe ich viele neue Erkenntnisse gewonnen, und konnte diese beim Schreiben der Arbeit umsetzen.

All colleagues at Mimetas, it was very special to see Mimetas growing – I started working at a small startup back in 2014, when we celebrated the 80s and 90s with David Hasselhoff with only a handful of people. Now we are already a middle sized company celebrating our own parties at the beach. It was very special to be part of this development. I want to thank everyone that supported me and my research during the last couple of years.

I am especially grateful to my interns who helped me a lot with the research of my thesis during their internships: Elisa, Simon, Lisette and Lam. Also Laura, who helped me a lot finishing the final experiments. And Linda, who continued to work for Mimetas after her internship and is still helping with getting the last paper published. Every one of you added their own personality to this work, thank you!

I also want to thank the Nephrotube team for a very interesting and intense collaboration, I had a lot of fun working with you and finishing the project successfully.

Furthermore, I would like to thank Kazu and his team at Astellas for all their kindness and interesting interactions and their hospitality when I was in Japan.

Ein großer Dank geht auch an meine Familie und schoonfamilie, insbesondere an meine Eltern und Irmela. Ohne euch würde ich wahrscheinlich immer noch schreiben. Danke, dass ich ihr mir die beiden Mäuse aus den Händen genommen habt und ich Zeit und Ruhe hatte die Arbeit fertig zu stellen.

In het bijzonder wil ik ook nog graag Toos en Johan bedanken. De kleine was bij jullie altijd in veilige handen wat me de rust gaf om aan mijn proefschrift te werken!

Mijn gezin. Charlotte, deine Frohnatur hat mich immer wieder angespornt, doch noch einen Satz zu schreiben. Jasper – Was war das doch immer ein besonderes Gefühl, dich während des Schreibens der letzten Kapitel in meinem Bauch zu fühlen und immer dabei zu haben.

Willem, ik weet niet of deze prestatie me zonder jou gelukt zou zijn. Ik zou er zeker nog een stuk langer over gedaan hebben, je bent de grootste steun van iedereen.

